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Substitute Claims

1. (Original) An axial flow device comprising:

a housing,

a substantially annular chamber within said housing to convey a substantially incompressible working fluid from an inlet to an outlet,

said chamber including at least two stages that each include a rotor section and a stator section,

said rotor section including a multi-bladed drive wheel positioned downstream of said inlet and operative to rotate around an axis to drive working fluid from the inlet to the outlet, and

said stator section being positioned downstream of the rotor section and including plural vanes substantially fixed relative to said housing and geometrically arranged to define a flow path having a cross-sectional area between vanes that increases from an entry point to an exit point of the stator section.

2. (Currently Amended) The device of claim 1, wherein [said stator vane] said vanes of said stator section are variable in pitch and operative as a flow straightener of said working fluid or to adjust the angle of attack of the working fluid upon entry into a following rotor section.

3. (Currently Amended) The device according to claim 1, wherein said outlet comprises a convergent annular chamber at a discharge nozzle whereby to increase velocity of [liquid] working fluid discharged from said outlet.

4. (Currently Amended) The device of claim 3, wherein said convergent annular chamber includes a variable throat area positioned immediately upstream of said outlet to vary the velocity of [the liquid] working fluid discharged from said outlet.

5. (Original) The device of claim 4, further including an actuator to vary the axial position of a nozzle plug whereby to vary effective area of said outlet.

6. (Currently Amended) The device of claim 4, further including balancing pistons operated by pressure differentials obtained by sensing discharge nozzle jet velocity and vessel velocity respectively to obtain a [desire] desired optimum working fluid discharge velocity relative to [vehicle] vessel velocity.

7. (Original) The device of claim 6, further including a nozzle plug position override effective to reposition said nozzle plug by overriding automatic positioning of said balancing pistons with hydraulic pressure.

8. (Currently Amended) The device of claim 1, further including at least one variable inlet guide vane positioned downstream of said inlet and operative simultaneously to change inlet area and whirl of [liquid] working fluid entering said inlet.

9. (Currently Amended) The device of claim 1, further comprising a fixed set of inlet guide vanes [position] positioned downstream of said inlet to adjust inlet whirl angle of [liquid] working fluid entering said inlet.

10. (Original) The device of claim 9, further comprising an inlet diffuser serving as an inlet duct positioned upstream of said inlet guide vanes.

11. (Original) An axial flow device to propel a vessel through water, said device comprising:

an axial flow casing having a rotor axis, said casing being fixedly mounted within said vessel,

an annular chamber within the casing to convey water from an annular inlet to an annular outlet, said chamber including multiple stages that each include a rotor section and a stator section,

said rotor section including a multi-bladed drive wheel positioned downstream of said inlet and operative to rotate upon said axis of the casing and drive water from the inlet to the outlet,

said stator section positioned downstream the rotor section and including plural vanes fixedly attached to said casing at spaced locations within the annular chamber, said stator section including plural vanes at spaced locations within the chamber to define flow passages between respective vanes each having a cross-sectional area normal to a direction of flow that increases from an entry point to an exit point of the stator section, and

a variable area discharge nozzle responsive to discharge velocity of water and velocity of the vessel to alter the area of discharge according to a desired operating set point.

12. (Original) The axial flow device of claim 11, wherein said stator vanes have variable pitch.

13. (Original) The axial flow device of claim 11, wherein said annular inlet includes a variable inlet guide vane stage that includes plural variable pitch vanes.

14. (Currently Amended) A method of conveying a substantially incompressible working fluid [in] through an axial flow device comprising:

defining a flow path in the axial flow device to convey working fluid from an inlet to an outlet,

providing multiple stages within said flow path that each include a rotor section and a stator section that follows said rotor section,

driving working fluid through said flow path by rotating the rotor section, and

lowering the speed of working fluid by providing increased flow path areas between vanes of the stator section as working fluid travels from the inlet to the outlet.

15. (Original) The method of claim 14 wherein said inlet includes variable inlet guide vanes having controllable pitch and said method further including throttling fluid flow at said inlet by altering the pitch of said inlet guide vanes.

16. (Currently Amended) The method of claim 14 wherein said outlet includes an exit guide vane stage operative to straighten flow of said working fluid and [increases] increase static pressure prior to discharge.

17. (Currently Amended) A method of controlling discharge velocity of water discharged from an axial flow device relative to water speed a vessel, said method comprising:

detecting discharge velocity of water discharged from the axial flow device,

detecting water speed of the vessel,

providing a discharge nozzle in said axial flow device having a variable area throat, and

utilizing said discharge velocity and [boat velocity] speed of said vessel to control the area of said throat according to a desired operating set point [based on the discharge velocity of the water and the speed of the vessel].

18. (Currently Amended) The method of claim 17, further comprising providing an actuator that drives the discharge nozzle, said detecting steps [includes] include detecting respective pressures associated with said discharge velocity and water speed of the vessel, and said utilizing step includes using the respective pressures to drive said actuator to an equilibrium position that defines a desired optimum throat area of the discharge nozzle.